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Identifying Sustainable Population Segments Using a Multi-Domain Questionnaire: A Five Factor Sustainability Scale

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Abstract

This study presents the creation of a measurement device to determine and define sustainability attitudes into identifiable sustainability segments. These segments were profiled with behavioral and sociodemographic data. Based on previous literature, key sustainability topics were identified from which a 31-item questionnaire was developed, the Five Factor Sustainability Scale (FFSS). With the FFSS, multiple domains of environmental sustainability can be assessed. We present results validating this measure using a factor–cluster segmentation approach in a nationally representative sample ($N = 508$). Five sustainability factors emerged: (1) sustainable spending, (2) sustainable skepticism, (3) sustainable responsibility, (4) sustainable support, and (5) sustainable mobility. A cluster analysis on this sample yielded four segments in which people were grouped according to their sustainable attitudes: (1) Convinced Sustainers, (2) Sustainable Wannabes, (3) Sustainable Non-Believers, and (4) Non-Sustainers. Results linking these segments to behavioral and demographic data show discernable differences between the segments, making the FFSS a valuable tool for future intervention studies aiming at sustainable behavior change.

Keywords

environmental sustainability, lifestyles, scale construction, segmentation, multi-domain sustainability segments

One of the major priorities for governments, businesses, and communities across the globe is encouraging people to adopt environmentally friendly lifestyles (Steg & Vlek, 2009). Yet, before we can start stimulating people to live sustainably, we need to understand how and why people make the

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sustainability choices they do. This means understanding existing views, practices, and attitudes related to sustainability and the possibilities for making people's lifestyles more sustainable.

For many behavior-change programs, it is difficult and costly to develop unique strategies that perfectly match the green lifestyle of every individual. While current computer technologies have opened up the possibilities to tailor computer-based interventions based on the uniqueness of each individual user (e.g., Kreuter, Farrell, Olevitch, & Brennan, 2013), three important issues should be noted. First, many actors have noted privacy concerns of such interventions based on monitoring behavior because many users are unaware of being monitored (e.g., Montgomery, 2015). Second, many behavior-change interventions are (partly) implemented in non-digital settings such as in communities (e.g., Scott, McCarthy, Ford, Stephenson, & Gorrie, 2016) and schools (e.g., Davis, Spaniol, & Somerset, 2015). Third, computer-based interventions could potentially increase digital inequality (e.g., Robinson et al., 2015) because specific vulnerable populations may be difficult to reach through such interventions. A solution is to identify meaningful homogeneous groups of people ("segments") with relatively similar attitudes and behaviors toward sustainability. These sustainability segments can be identified by measuring attitudes and behaviors toward sustainability and can be used for designing targeted strategies promoting sustainable living that fit the sub-groups under investigation (e.g., Kumanyika & Grier, 2006).

The current study adds to this line of thought in designing a questionnaire to determine and define sustainability attitudes into sustainability segments and to profile these segments using behavioral and socio-demographic data, taking into account well-developed lifestyle profiles. Our research adds to previous work in this field by focusing on broad lifestyle groups rather than one sustainability topic only. Our article presents results of a factor–cluster segmentation approach in a large, nationally representative sample from which a questionnaire identifying environmental sustainable lifestyle groups was created.

The term "environmental sustainable lifestyle" can best be understood through key definitions of the terms (1) *sustainability*, (2) *environmental*, and (3) *lifestyle*. First, to explain what the key term of "sustainability" entails, the concept of *sustainable development* is often used. The most influential definition was provided by the Brundtland Commission (1987, Chapter 2), which defined "sustainable development" as "*development that meets the needs of current generations without compromising the ability of future generations to meet their own needs.*" The Brundtland report further specifies that sustainable development comprises three domains: (1) social, (2) economic, and (3) environmental. Our study focuses specifically on the domain of environmental sustainability.

The second key term is "environmental". Based on an analysis of many different definitions and approaches to environmental sustainability, Moldan, Janousková, and Hák (2012, p. 7) argue that environmental sustainability basically entails "*maintaining nature's services at a suitable level*". In their view, living in an environmentally sustainable world means respecting the earth's limitations. In order to protect the environment's benefits for human welfare, the planet's renewable as well as non-renewable resources should be preserved.

The third key term is "lifestyle" which entails "*a distinctive, hence recognizable, mode of living*" (Stobel, 1981, p. 28). Studying lifestyles provides insights into behavior (what people actually do or refrain from doing) and determinants of that behavior. Behavior determinants (e.g., attitudes) explain why people act in a certain way, and what a style of living means to them and others (Chaney, 1996). Thus, based on the definitions of our three key terms, we define an environmentally sustainable lifestyle as: *a distinct mode of living in which people carefully consider the world's nature systems and use (natural) resources without compromising the needs of future generations.*

Based on previous studies, the main sub-domains that can be identified for environmental sustainability are (1) sustainability in society (and people's needs), (2) sustainability in the household (e.g., using energy sources sustainably, recycling behavior), (3) consumer behavior (e.g., buying sustainable, eco-friendly products), (4) conscionable mobility (e.g., traveling small distances by bike rather than by

car), and (5) taking care of nature and animals (Evans & Abrahamse, 2009; Hanss & Böhm, 2012; Larson, Stedman, Cooper, & Decker, 2015; Milfont & Duckitt, 2010; Morelli, 2011).

To measure attitudes toward and behaviors central to environmental sustainability and to identify lifestyle profiles, questionnaires are typically used as an important research tool (overviews: Böhringer & Jochem, 2007; Singh, Murty, Gupta, & Dikshit, 2012). Previous literature shows that the majority of studies focusing on environmentally sustainable groups designed questionnaires that relate to one sub-domain only such as conscionable mobility (Julsrud, 2014), domestic energy use (Newton & Meyer, 2013), or sustainable food consumption (Vanhonacker, van Loo, Gellynck, & Verbeke, 2013).

Over the years, several single-domain segmentation studies have been conducted, which vary in segmentation attributes used to identify sustainability profiles (e.g., by using attitudinal items) and profiling attributes used to further specify the identified groups (e.g., by using socio-demographic items). While a single-domain focus on "mobility" segmentation (review in Haustein & Hunecke, 2013) or "sustainable food consumption" segmentation (review in Verain et al., 2012) can provide valuable insights for these specific areas in which sustainability can be improved (e.g., Finisterra do Paço, Barata Raposo, & Filho, 2009), it does not give a more general profile of sustainable lifestyles in society.

Furthermore, it may be difficult to pinpoint one lifestyle exclusively as sustainable. In fact, some scholars propose that multiple sustainable lifestyles exist. A qualitative fieldwork study conducted by Evans and Abrahamse (2009) revealed that the meaning of terms such as "sustainable living" or maintaining a "green lifestyle" differed among social groups. For example, some people find themselves sustainable when they sometimes buy environmental-friendly products. By contrast, others feel that—in order to live in a truly sustainable way—more extreme measures are necessary, such as eating raw food only or following a strict vegan diet. Thus, in order to provide a full picture of sustainability, we need to have a general measuring tool that takes this diversity in opinions and behaviors into account.

In order to reach this goal, we developed the Five Factor Sustainability Scale (FFSS). With the FFSS, we aimed to develop a brief and comprehensive questionnaire covering multiple domains of environmental sustainability. Furthermore, by using attitudinal data combined with behavioral items and socio-demographic information, we can identify broad sustainability lifestyle segments, which may be easily applied to diverse areas interested in changing sustainability behaviors.

Method

In this section, we first describe the construction of the measurement instrument, followed by the sampling procedure. Finally, we provide information about the analyses.

Questionnaire Development

The construction of the questionnaire consisted of several phases. First, we identified key domains of environmental sustainability by scrutinizing the extant literature (see Introduction section). In this first phase, we identified five sustainability domains from prior questionnaires: (1) sustainability in society, (2) sustainability in peoples' own household and/or neighborhood (i.e., reuse, recycling, and using sustainable energy resources), (3) sustainable consumption, (4) sustainable mobility, and (5) taking care of nature and animals. Our literature review led to a large body of topics for attitudinal items relating to each of these five domains. Item-topics were inspected for overlap and grouped according to fit into these five domains.

Second, items needed to be formulated for a general audience. Most sustainability studies have been conducted with higher educated populations (e.g., university students), and many items from previous

questionnaires contained complex phrases. Thus, we constructed simplified items such that they reflected a clearly identifiable topic, were unambiguously formulated, clearly worded using primary terms, and avoided double negations with answering categories. Likert-type items were formulated and categorized into each of the identified domains following established item-creation guidelines (DeVellis, 2012; Groves et al., 2009).

We strived for a questionnaire that took no longer than 20 min to complete, using the rule of thumb that respondents approximately answer 4–6 items per min (Callegaro, Lozar Manfreda, & Vehovar, 2015). Furthermore, we created items that could be answered by every individual, irrespective of personal circumstances. For instance, questions about driving behavior can only be answered by individuals with a driver's license and access to a motor vehicle. Other individual differences we took into account include home ownership, socio-economic status (SES), and specific diets (e.g., while eating gluten-free may be a lifestyle option for some, it is mandatory for people with celiac disease). Another goal was to create a widely applicable, well-discriminating measurement device including a substantial pool of items such that groups of respondents with distinguishable attitudes toward sustainability can be identified.

Finally, all initial items were qualitatively pre-tested for clarity and comprehension following the procedure of Hedlund-de Witt, de Boer, & Boersema (2014, p. 44). A small group of respondents ($n = 10$) were asked to provide feedback about the Likert-type items and to think aloud when answering them. Problematic items were modified or replaced based on observations, participants' comments, and questions. The final questionnaire consisted of 38 attitudinal items (Appendix Table A1). Each item was followed by a 5-point rating scale: 1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral*, 4 = *agree*, 5 = *strongly agree*.

In addition to the 38 attitudinal items, 39 behavioral items were matched to the five sustainability domains (Appendix Table A2). Additional data on respondents' socio-demographical background, coming from an existing database (Motivaction, 2017), were linked to the questionnaire data: gender, age, education, SES (e.g., income, working hours), and living situation (e.g., household size, having children). Behavioral and socio-demographical data were used to profile the segments that were identified by a cluster analysis.

Data Collection: Sampling and Procedure

Data were collected through an online panel consisting of a representative pool of the Dutch general population with access to the Internet. Using online panels is common in the Netherlands since 9 in every 10 households have a broadband Internet connection (Statistics Netherlands, 2015). Fieldwork was carried out by a well-experienced marketing research company, which has built a large online representative panel over the years (Motivaction, 2017).

The sample was randomly drawn from this panel applying only one selection criterion that participants needed to be of voting age (i.e., >18). Participants were invited by e-mail to participate in the survey. Propensity scores were used to reduce selection bias. The final number of panel members that participated in the survey was 508. Respondents received points for their survey cooperation, which could be exchanged for online products.

Data were weighted to correct for a possible oddity of representativeness. Interactions for the following variables were weighted: gender, age, completed education, and region. The sampling procedure resulted in a sample that reflected the diversity of the Dutch population based on key socio-demographical variables.

The sample consisted of 50.3% females. The respondents' age ranged between 18 and 70 years old (M_{age}= 44.63, $SD_{age} = 14.68$). Of 508 respondents, 27.6% were highly educated (university), 50.4% were middle educated (vocational training or high school), and 22.0% had a low education level

(elementary school only). Regarding income, 45.1% had a modal income and 20.8% had a low income, with a nonresponse rate of 20.7%.

Control questions (1 = *disagree*, 2 = *neutral*, 3 = *agree*) showed that respondents found the survey interesting ($M = 2.62$, $SD = .59$), that it contained clear items ($M = 2.80$, $SD = .47$), scored low on whether the survey contained too many questions ($M = 1.58$, $SD = .67$), and participants found it nice to fill out ($M = 2.58$; $SD = .59$). Thus, the questionnaire as a whole and its length were considered appropriate.

Data Analysis

Data were analyzed using IBM SPSS Statistics (Version 24). To analyze the data, exploratory factor analysis (EFA) was executed to examine to which extent the attitudinal items measure a construct related to environmental sustainability following the guidelines in Morrison (2009):

For each of the five identified sustainability domains, we developed at least 6 items trying to balance using too few items versus using too many items (e.g., in particular also in view of feasibility in a multi-construct survey). Principal axis factoring (PAF) was used as the extraction method as advised when developing scales (Worthington & Whittaker, 2006), since this method does not require multivariate normality. To reveal clear structures among the items, a rotated factor solution was chosen. In this study, oblique promax rotation was selected as we expected the factors to (somewhat) correlate. Bartlett's test of sphericity (<.001) and the Kaiser–Meyer–Olkin measure of sampling adequacy (.892) indicated that the data were suitable for factor analysis. Decisions on the number of valid factors were made using a combination of the Kaiser (1960) criterion and a scree-test (Cattell, 1966). Some individual items were dropped based on their poor statistical properties (e.g., loading <.3), which reduced the initial item pool from 38 attitudinal items to 31 items (Appendix Table A1). Per remaining factor, we then calculated the internal consistency using Cronbach's α.

Subsequently, a cluster analysis was performed to discover whether attitudinal homogenous groups could be identified in the data set, following the steps in Mooi and Sarstedt (2011, pp. 302–304). First, we selected our variables for clustering, which were the factor scores derived from the factor analysis. The decision for this factor–cluster segmentation approach was based on the fact that we tested our sustainability questionnaire (i.e., the data structure) for the first time. Then, we made a choice on the clustering procedure. As a starting point, we performed hierarchical clustering applying Ward's method to define the number of clusters. Our stopping rules included analyzing the dendrogram, a scree-diagram, and icicle plots. This procedure suggested 12–20 possible clusters.

Based on this result, we changed to non-hierarchical k-means clustering (i.e., a partitioning method), as this method allows to pre-specify the number of clusters. This was more appropriate as working with so many clusters (12–20) is not practical. Because we had some prior knowledge of possible sustainability lifestyle groups (Hoekstra, Verheggen, & Hannink, 2013) and we had more than 500 cases, a non-hierarchical clustering procedure was appropriate to use on our data set. First, we pre-specified five clusters in our analysis based on Hoekstra et al. (2013), which did not provide us with very clear distinguishable groups. Second, we pre-specified four clusters, which provided four relatively stable groups (i.e., segments). We also tested for more (up to eight) or less (three) pre-specified clusters, these analyses confirmed that the four pre-specified clusters gave the best result.

Results

Exploratory Factor Analysis

From the EFA, which included the attitudinal items, five factors were generated representing the following constructs: (1) sustainable spending, (2) sustainable skepticism, (3) sustainable

Table 1. Summary of Final Factor Analysis of Items Covering "Attitudes Toward Sustainability."

Factor	Highest Factor Loading	Example Attitude Statement (Item With Highest Loading on Factor)	Number of Items	Cronbach's α
1. Sustainable Spending	.876	It is understandable that sustainable living may cost a little extra.	5	.834
2. Sustainable Skepticism	.686	Animal rights are blather.	8	.781
3. Sustainable Responsibility	.630	Companies should be subsidized for being sustainable.	8	.802
4. Sustainable Support	.550	I am in favor of installing as many solar panels as possible.	5	.637
5. Sustainable Mobility	.720	Fuel should become more expensive, so that more people will travel by public transport.	5	.758

responsibility, (4) sustainable support, and (5) sustainable mobility (Table 1). Therefore, we named this measurement device the FFSS.

The obtained factors partially differed from the domains we initially identified based on the literature: (1) sustainability in society, (2) sustainability in own household and neighborhood, (3) sustainable consumption, (4) sustainable mobility, and (5) sustainable environment. Factors 1, 2, and 3 consist of a combination of items from the initial domains on sustainability in society, sustainable consumption, and sustainable environment, respectively. Factors 4 (initial domain: sustainability in own household and neighborhood) and 5 (initial domain: sustainable mobility) corresponded with the domains we identified initially. Factor 4 was named "sustainable support" instead of "sustainability in own household and neighborhood" after analyzing the factor structure. Originally, 7 items loaded on Factor 4 "sustainable support," which resulted in an unacceptable Cronbach's α (< .40). For that reason, 2 items were dropped to increase Cronbach's α to .637 (see Table 1 and Appendix Table A1). The final questionnaire contained 31 items.

Cluster Analysis

Attitudinal segmentation. To define segments, we used a factor–cluster segmentation approach. The five new variables resulting from the EFA (i.e., variables composed of factor scores) were used as input for the clustering procedure. The cluster analysis generated four relatively stable segments (Table 2).

High scores indicate a more positive attitude toward sustainability. Note that Factor 2 is formulated in a negative sustainable direction, that is, higher scores on this variable indicate that one's attitude toward sustainability is less skeptical. Each segment, based on mean factor scores, has its own profile and has been named accordingly.

The following four segments were identified: (1) Convinced Sustainers, (2) Sustainable Wannabes, (3) Sustainable Non-Believers, and (4) Non-Sustainers. The Convinced Sustainers group scores high on all factor variables. The people in this segment report to live sustainably overall: They are willing to spend more on sustainable products and think others should do this as well. In their view, sustainability is an important concept, and people should take responsibility to make the world a more sustainable place.

Sustainable Wannabes support the idea that sustainability in general is important, but they are not willing to invest in it themselves. For example, they acknowledge that saving energy is important but are not enthusiastic about higher costs for green power compared to normal energy. In addition, they are not fond of the idea to travel sustainably.

Sustainable Non-Believers do not value the concept of sustainability but show positive attitudes toward sustainable living. For example, this group has positive feelings toward public transportation

Table 2. Mean Factor Scores and Standard Deviations [In Brackets] on the Four Attitudinal Sustainability Segments Based on Factor Variables.

[a]Factor Variable	Convinced Sustainers[1]	Sustainable Wannabes[2]	Sustainable Non-Believers[3]	Non-Sustainers[4]
1. Sustainable spending	1.03^{234} [0.63]	-0.13^{134} [0.69]	0.11^{124} [0.54]	-1.11^{123} [0.69]
2. Sustainability skepticism	1.06^{234} [0.60]	0.17^{134} [0.58]	-0.23^{124} [0.52]	-1.08^{123} [0.75]
3. Sustainable responsibility	0.75^{234} [0.70]	-0.05^{134} [0.56]	0.21^{124} [0.71]	-1.06^{123} [0.75]
4. Sustainable support	1.00^{234} [0.62]	0.37^{134} [0.54]	-0.44^{124} [0.44]	-0.99^{123} [0.59]
5. Sustainable mobility	0.85^{234} [0.88]	-0.59^{13} [0.49]	0.47^{124} [0.61]	-0.76^{13} [0.91]
n	111 (22%)	148 (29%)	149 (29%)	100 (20%)

Note. $N = 508$.

[a]Superscript numerals indicate significant differences (analysis of variance post hoc analysis [Scheffe test, $p < .05$] testing differences among all group combinations). For example, the notation 1.03^{234} (first cell) indicates that Convinced Sustainers' attitude toward sustainable spending significantly differs from Sustainable Wannabes (−0.13), Sustainable Non-Believers (0.11), and Non-Sustainers (−1.11). Note that significant differences in cluster analysis are inherent to this method.

and does not mind paying a little extra for sustainable products. However, according to them, problems related to sustainability seem a bit overrated; people are too concerned about environmental issues.

Non-Sustainers show negative feelings toward sustainable living. They are especially not willing to spend their money on sustainable products or services. This group wants to live as they are used to without having to think about sustainability at all.

Behavioral tendencies within attitudinal segments. To further profile these segments, we also analyzed the behavioral items related to the sustainability domains. The purpose of this analysis is 2-fold: (1) to profile the attitudinal segments and (2) to study whether the behavioral measures correspond to the outcomes of attitudinal measures in each segment (i.e., Do respondents with positive attitudes toward environmental sustainability also behave in a sustainable manner?). Appendix Table A2 shows the mean scores and standard deviations on the behavioral items for each attitude-based segment ($p \leq .001$).

The attitudinal segments seem to have predictive value with respect to sustainable behavior. Overall, the highest mean scores on sustainable behavior were found for the Convinced Sustainers and the lowest mean scores for the Non-Sustainers. These two segments significantly differ on most behavioral items.

Comparing the two middle segments (Sustainable Wannabes and Sustainable Non-Believers), the outcomes for the more general behaviors, consumption behaviors, and nature-related behaviors do not show major differences. However, higher mean scores within the household category were found for Sustainable Wannabes, whereas higher mean scores within the mobility category were found for Sustainable Non-Believers. This difference corresponds to the outcomes of the cluster analysis. The behavioral items that were presented within the household category can be related to the "sustainable support" factor on which Wannabes scored higher than Non-Believers. Furthermore, Non-Believers showed more positive attitudes and behaviors toward the "sustainable mobility" factor than the wannabes.

Socio-demographic characteristics of attitudinal segments. Additional socio-demographical information was linked to the data regarding attitudinal segments. Analyzing this information made the profiles of the four sustainable lifestyle groups complete (Table 3). Findings are presented per socio-demographic variable.

Regarding gender, we found more females in the Sustainable Non-Believers group and less in the Non-Sustainers group, compared to male respondents. For the other segments, no distinct differences were observed related to gender.

Table 3. Percentages of Socio-demographical Characteristics of Each Attitudinal-Based Segment.

Socio-Demographics	Convinced Sustainers	Sustainable Wannabes	Sustainable Non-Believers	Non-Sustainers
Gender				
Female	49.5	43.2	67.8	35.6
Age				
(18–24)	11.8	6.1	20.9	6.9
(25–34)	13.6	20.3	25.0	8.9
(35–44)	21.8	22.3	15.5	18.8
(45–54)	19.1	23.0	15.2	33.7
(55–70)	33.6	28.4	27.7	31.7
Education				
High	41.4	31.8	18.0	20.8
Middle	46.8	52.0	48.7	53.5
Low	11.7	16.2	33.3	25.7
Income				
Low	21.6	14.3	26.2	21.8
Middle	45.0	50.3	42.3	42.6
High	7.2	8.2	2.7	6.9
Other[a]	26.1	27.2	28.9	27.8
House owner	61.3	64.6	49.0	54.0

[a]"Other category" reflects: "don't want to say," "unknown," and "don't know" responses.

For age, there is a large group of older respondents in the Convinced Sustainers segment compared to the other age-groups. Furthermore, the youngest respondents (ages 18–24 and 25–34) are the least represented in the Non-sustainers segment. Also, not many respondents of the 18–24 category are represented in the Sustainable Wannabes segment. Finally, there are fewer middle-aged respondents (35–44 and 45–54) in the Sustainable Non-Believers segment.

For education, respondents in the low educational group seem to be less represented in the segments that care the most about sustainability compared to the other educational categories. Respondents with mid-level education are found almost equally in each group. Those with the highest level of education are represented most in the Convinced Sustainers group and among the Sustainable Wannabes. This makes education the strongest differential predictor among demographic variables in terms of sustainable attitudes.

Regarding income, no mentionable differences were found among the identified segments, except for the low-income respondents being less represented in the Sustainable Wannabes segment compared to the other segments. Linked to income, the results for house-ownership show that more house-owners are found house-owners are found in the Convinced Sustainers and Sustainable Wannabes segments than in the other two segments. Thus, house-owners are more environmentally sustainable than people who do not own a house.

Discussion

The current study aimed to design and test a concise yet encompassing questionnaire to identify differential sustainability groups based on a broad array of sustainability attitudes linked to behavioral and socio-demographic data. Our results showed that 31 of our initial 38 attitudinal items captured five sustainability domains: (1) sustainable spending, (2) sustainable skepticism, (3) sustainable responsibility, (4) sustainable support, and (5) sustainable mobility. Therefore, we named our measurement device the FFSS. These five domains (i.e., factors) were used in a cluster analysis, which yielded four

segments in which people were grouped according to their sustainable attitudes: (1) Convinced Sustainers, (2) Sustainable Wannabes, (3) Sustainable Non-Believers, and (4) Non-Sustainers. The results indicate that the FFSS captures the relevant topics about sustainability necessary for using this measurement device for behavior-change interventions related to sustainability.

Theoretical Implications

Our results are in line with previous research showing that measurements of attitudes can be linked to audience segmentation in informative ways (e.g., Böhringer & Jochem, 2007; Singh et al., 2012). In addition, our results go beyond previous research in two ways: (1) in covering multiple domains of environmental sustainability within one scale and (2) by relating sustainability attitudes to corresponding behaviors in distinguishing them into lifestyle profiles. Most previous research did so in relating attitudes to socio-demographic variables. Our study adds to that in relating sustainability attitudes not only to socio-demographic but also to lifestyle behaviors resulting in a clear segmentation and support for the construct validity of our measurement device.

Although the obtained factors partially differed from the initial domains identified from the literature (e.g., sustainable consumption, sustainability in own household and neighborhood; see Method section on Questionnaire Development), it makes sense that the attitudinal items reflect a particular attitude toward certain aspects of sustainability not specifically related to one domain. For example, one's attitude toward higher costs for sustainable consumption will likely correlate with a similar attitude in another domain, for example, higher costs for sustainable mobility. Therefore, by including the various domains into one questionnaire, it is understandable that these attitudes converge into one factor and are therefore less domain-dependent.

A factor–cluster segmentation approach generated four relatively stable segments: (1) Convinced Sustainers (in support of all sustainability domains), (2) Sustainable Wannabes (in support of sustainability in general but not willing to invest by themselves), (3) Sustainable Non-Believers (no belief in the concept of sustainability but positive attitudes toward sustainable living), and (4) Non-Sustainers (negative feelings toward sustainable living). The FFSS yielded identifiable segments in which a varying degree of support for environmental sustainability can be recognized, from the most supportive group Convinced Sustainers to the least supportive group "Non-Sustainers." This result seems to be in line with outcomes of previous one-domain research. For example, Gilg, Barr, and Ford (2005) found a similar pattern for green consumers. The outcome of the cluster analysis of the current study may be used for future research to further analyze relations between those groups and their related consumer behavior, environmental, or political attitudes.

In further profiling these differential sustainability groups, the attitudinal segmentation was connected to the groups' sustainability behaviors. Results showed that the attitudinal segments have predictive value in regard to sustainable behavior. Overall, the segment of Convinced Sustainers scored highest on sustainable behavior, whereas the segment of Non-Sustainers scored the lowest. Thus, respondents with stronger positive attitudes toward environmental sustainability also behave in more sustainable ways.

Finally, we related socio-demographical variables to the sustainable lifestyle segments. Most important for discriminating between the sustainability groups is the level of education. Individuals with the highest level of education are represented most in the two pro-sustainability groups (i.e., Convinced Sustainers and Sustainable Wannabes). In contrast, those with the lowest level of education are less represented in those segments but can be found most in the segments that care the least about sustainability. Respondents with mid-level education are found almost equally in each group. This finding is in line with previous one-domain research, which has shown that education is often a remarkable socio-demographic variable that distinguishes green groups (Anable, 2005; Newton & Meyer, 2013).

As in previous research, differences between other socio-demographical variables are not that clear (cf. Verain et al., 2012). Although previous research shows a strong connection between educational level and income (e.g., Elliott, Destin, & Friedline, 2011), our results do not show similar results for income as for education with regard to sustainability attitudes. We found gender and age differences only between some of the segments: more females in the Sustainable Non-Believers group, and Convinced Sustainers (i.e., the most supportive group) seem to be clearly older than respondents in any of the other segments.

Implications to Social Marketing Practice

The four sustainability segments found in this study are important when designing social marketing campaigns for issues related to sustainability, such as promoting recycling behavior (Martin, Ross, & Irwin, 2015), reducing waste (Pearson & Perera, 2018) and littering (Almosa, Parkinson, & Rundle-Thiele, 2017), and promoting sustainable mobility behavior (Taniguchi & Fuji, 2007). For many of these sustainability behaviors, people from distinct FFSS sustainability groups hold different attitudes and show different behaviors. This implies that people from the different segments can be approached with different strategies to optimize the potential effectiveness of such campaigns. For instance, campaigns aimed at Convinced Sustainers should be primarily focused on consolidating the sustainability behavior, as this group is likeliest to already show the desired behavior. Sustainable Wannabes have a positive attitude toward sustainability but are unwilling to invest themselves. This group could then be approached with campaigns that emphasize that small differences in behavior (e.g., by recycling waste at home in different bins for food waste, plastics, glass, and paper) can have a large impact (e.g., by showing the amount of materials recycled on a monthly basis), thus emphasizing a large "sustainability" return on investment. Sustainable Non-Believers could be persuaded to show sustainability behavior by focusing on elements of the desired sustainability behavior that are unrelated to sustainability per se (e.g., by arguing that if much recycled material is available, the price for many products can drop). Non-Sustainers, finally, have a very negative attitude toward sustainability. For this group, social marketers could consider a campaign aimed at changing social norms on sustainability in their social groups, as a first step toward a more positive attitude toward sustainability. New technologies (Kouris & Koutsouris, 2016) and social media (Korda & Itani, 2013) make it increasingly easier to design such targeted social marketing campaigns aimed at a segment of the target population.

Methodological Reflections and Limitations

One of the strengths of our approach is that the items of the questionnaire were collected and selected through several phases. To measure "environmental sustainability" as a general construct, we identified the key domains from the literature and prior questionnaires, which resulted in a large body of item-topics reflecting each of five domains. Focus groups further guided which topics would be useful for segmentation based on multiple sustainability domains. As a final step in the construction phase, we pre-tested all items in a qualitative think-aloud procedure for clarity and understanding.

Compared to most previous research, the FFSS is not limited to just one sustainability domain. Furthermore, where most previous sustainability studies have been conducted with higher educated populations, our questionnaire has wide applicability to a general audience and can also be used with lower educated participants. In general, the quality of the data on which the results are based can be considered high because they were collected through a representative sample of the Dutch population of over 18 years of age. To overcome response selectivity, we used a well-validated panel. To avoid selection bias, propensity scores were used, and data were weighted to correct for a possible oddity of representativeness. A limitation might be that we can only draw conclusions based on one sample at a specific moment in time and not any changes over time. A second sampling or

longitudinal approach would be warranted to increase long-term insights across the sustainability domain and the lifestyle groups.

Another strength of our approach is that the data were analyzed in several rounds in order to provide a step-by-step account of optimal selection and dimensional interpretations. We applied PAF to extract the best fit of factors and items and item analyses to further arrive at reliable subscales within the larger scale (cf. Worthington & Whittaker, 2006). While all subscales except for one showed good internal consistency with Cronbach's αs well beyond .75, improvements can be made for the subscale "Sustainable Support" for which the α was below .70. Furthermore, we dropped items with a loading of <.3. To make the questionnaire even shorter, a stricter number could be chosen to eliminate items (e.g., a loading of <.4 which 6 of the 31 items now have as shown in Appendix Table A1). When more items are dropped, it is important to re-evaluate the outcome of the factor analysis (e.g., the number of items per factor) and to calculate Cronbach's α again with the remaining items.

Also a cluster analysis was conducted in steps, to identify homogenous attitudinal-based sustainability groups. In future research, a confirmatory factor analysis using structural equation modeling could further validate our instrument FFSS in which the reliability and validity of the questionnaire is fully considered. In addition, we recommend to apply the FFSS to various user-groups and relate the dimensions and segments to various behaviors in further analyzing its discriminatory and predictive validity. Finally, an international comparison would largely increase the validity and usability of the FFSS as well as providing highly relevant insights in sustainability attitudes and behavior across diverse countries.

Conclusion

In all, we constructed a widely applicable measurement instrument, named the FFSS, to assess multiple domains of environmental sustainability. Among its strengths are easily comprehensible items for a broad audience, a limited length, covering various domains of sustainability, discriminating between pro and con levels of environmental sustainability, and ease of use in different research designs. Results demonstrated that respondents' sustainability attitudes provide a solid basis for segmentation reflecting gradual levels of strong to weak support for environmental sustainability. Analyses of participants' sustainability behavior and socio-demographic variables further supported the FFSS's usefulness. Therefore, the FFSS can be useful for designing targeted social marketing campaigns related to changing sustainable behaviors.

Appendix

Table A1. Descriptive Figures of 38 Attitudinal Items Questionnaire.

Attitudinal Items	Mean	Standard Deviation	Factor	Factor Loading
[a]Sustainable living is too expensive	2.93	0.857	1	.587
I am fine with green power being slightly more expensive than other forms of energy	2.57	1.000	1	.669
It is understandable that sustainable living costs a little extra	2.89	0.976	1	.876
I am willing to pay slightly more for environmentally friendly products	2.97	1.014	1	.787
I am willing to pay slightly more to drive an electric car instead of a regular one	2.57	1.050	1	.592
[a]Sustainability is overrated	3.05	0.940	2	.348

(continued)

Table A1. (continued)

Attitudinal Items	Mean	Standard Deviation	Factor	Factor Loading
[a]I lack concern for sustainability	3.49	0.925	2	.402
[a]I find living comfortably more important than living sustainably	2.94	0.913	2	.604
[a]The value of organic products is overrated	2.93	1.001	2	.499
[a]People worry too much about the environment	3.33	1.000	2	.679
[a]As time goes by, nature will recover again	2.81	0.975	2	.453
[a]I believe hunting is good for the balance in nature	2.87	1.052	2	.642
[a]Animal rights are blather	3.77	1.051	2	.686
The government should ensure a sustainable society	3.62	0.772	3	.468
Sustainability is important in my choice for a political party	3.01	0.991	3	.308
Supermarkets should only sell organic meat	2.74	1.113	3	.344
Companies should be subsidized for being sustainable	3.07	0.935	3	.630
Nature shops should receive subsidies	2.75	1.038	3	.542
I worry about the rising sea level	3.10	1.015	3	.425
The government should do more to solve climate-change problems	3.56	0.912	3	.530
You should be really careful with all resources provided by nature	3.94	0.779	3	.304
[a]Sustainability is a threat to a strong economy	3.51	0.842	4	.502
[a]I find it annoying having to use different containers for different types of waste	3.63	1.112	4	.368
I am in favor of installing as many solar panels as possible	3.46	0.978	4	.550
[a]Many people exaggerate in their efforts for saving energy	3.41	0.921	4	.456
Most people waste a lot of water	3.80	0.685	4	.357
I like to travel by public transport (e.g., the bus or the train)	2.63	1.298	5	.665
[a]I prefer to travel by car	2.77	1.217	5	.580
Fuel should become more expensive, so that more people will travel by public transport	1.95	0.956	5	.720
Car owners should pay more for driving their cars	2.54	1.190	5	.523
Car owners are careless about the environment	2.63	1.064	5	.662
I believe that everyone should live a sustainable life	3.44	0.839	Dropped item	
Volunteer work is important for a sustainable society	3.21	0.967	Dropped item	
I feel co-responsible for global warming	3.08	1.001	Dropped item	
Feeding wild animals is detrimental to nature	3.42	0.897	Dropped item	
Building paths in nature reserves is detrimental to the environment	2.74	1.884	Dropped item	
I oppose big wind farms	2.48	1.075	4—Dropped item[b]	−.604
[a]I prefer receiving important mail (e.g., *bank statements*) on paper than by e-mail	3.46	1.151	4—Dropped item[b]	.339

Note. $N = 508$. Each Likert-type item is measured by a 5-point rating scale (1 = *strongly disagree*, 5 = *strongly agree*).
[a]Recoded to interpret data into the same direction (i.e., higher scores indicate pro-sustainable attitudes).
[b]Dropped to increase internal reliability.

Table A2. Mean Scores and Standard Deviations [In Brackets] on Behavioral Items for Each Attitudinal-Based Segment.

[a]Behavioral Items	Convinced Sustainers[1]	Sustainable Wannabes[2]	Sustainable Non-Believers[3]	Non-Sustainers[4]
In general				
I volunteer to help others in society	3.01 [1.49]	2.42 [1.49]	2.53 [1.24]	2.30 [1.43]
I live sustainably as much as possible	3.86[234] [0.72]	3.18[14] [0.88]	2.84[14] [0.78]	1.98[123] [0.89]
I read a lot about sustainability	3.09[234] [1.00]	2.28[14] [0.97]	2.31[14] [0.79]	1.58[123] [0.78]
I live sustainably because many people around me do so as well	2.36[4] [1.05]	2.09[4] [0.91]	2.31[4] [0.77]	1.48[123] [0.70]
I mostly buy products that have been produced sustainably	3.53[234] [0.77]	2.67[14] [0.91]	2.66[14] [0.82]	1.87[123] [0.87]
I encourage those around me to live sustainably	3.26[234] [1.05]	2.41[14] [1.04]	2.39[14] [0.91]	1.56[123] [0.78]
I go to meetings about sustainability	1.75[24] [0.93]	1.36[13] [0.71]	1.80[24] [0.94]	1.18[13] [0.48]
Household				
[b]Usually, I throw all my garbage away in the same waste bin	4.34[34] [1.01]	4.26[34] [1.00]	3.48[12] [1.25]	3.44[12] [1.55]
[b]I often throw food away	4.12[234] [0.79]	3.55[1] [0.99]	3.47[1] [1.08]	3.39[1] [1.28]
I dispose of empty batteries at dedicated battery collection points	4.54[34] [0.91]	4.38 [1.01]	3.87[1] [1.12]	3.85[1] [1.51]
I have green power at home	3.78[34] [1.52]	3.33 [1.60]	2.93[1] [1.57]	2.56[1] [1.64]
Before going to sleep, I switch off all lamps in my house	4.72[3] [0.57]	4.76[3] [0.45]	4.35[12] [0.98]	4.55 [0.81]
[b]I always leave devices such as the television on stand-by	3.83[4] [1.31]	3.70[34] [1.37]	3.27[2] [1.38]	2.93[12] [1.54]
I save energy by sweeping my house instead of vacuuming	1.98 [1.19]	1.99 [1.21]	2.14[4] [1.08]	1.68[3] [1.10]
I save energy by using as little water as possible	3.80[234] [0.89]	3.24[14] [1.00]	2.92[1] [1.08]	2.52[12] [1.24]
In order to save energy, I lower the central heating thermostat	4.24[34] [1.00]	4.05[4] [1.08]	3.57[1] [1.09]	3.09[12] [1.43]
Consumption				
[b]I only buy sustainable products when they are on sale	3.22[234] [1.07]	2.72[1] [0.94]	2.67[1] [0.85]	2.56[1] [1.16]
I only purchase electrical appliances with a sufficient energy label	3.85[4] [1.03]	3.48 [1.08]	3.33 [1.05]	3.09[1] [1.25]
I buy second-hand clothes	2.49[24] [1.42]	1.82[13] [1.06]	2.38[24] [1.26]	1.72[13] [1.07]
I take worn-out shoes to the shoemaker's for repair	3.31 [1.46]	3.05 [1.37]	3.00 [1.28]	2.59 [1.41]
I eat as little meat as possible	3.07[234] [1.25]	2.15[1] [1.14]	2.49[14] [1.01]	1.69[13] [0.96]
I give money to a charity that finds sustainability important	3.02[234] [1.37]	2.29[14] [1.24]	2.26[14] [1.07]	1.51[123] [0.83]
I take old things to the thrift shop	4.12[34] [1.03]	3.70[4] [1.29]	3.50[1] [1.21]	3.23[12] [1.38]
In the supermarket, I make sure to buy sustainable brands	3.24[234] [1.03]	2.28[14] [1.00]	2.48[14] [0.90]	1.42[123] [0.61]
Mobility				
[b]I only travel by public transport when the corresponding costs are compensated	4.29[3] [0.90]	3.85 [1.17]	3.75[1] [1.08]	3.54 [1.43]
I usually take the bike, even if this means that I am traveling longer	3.55[24] [1.30]	2.72[1] [1.29]	3.30[4] [1.29]	2.41[13] [1.26]
I avoid rush hour to save fuel	2.57[4] [1.39]	2.34 [1.33]	2.66[4] [1.24]	1.73[13] [1.16]
Whenever I travel by plane, I pay a little extra to be able to fly CO2 neutral	2.46[4] [1.36]	1.99 [1.09]	2.19 [1.03]	1.62[1] [1.03]

(continued)

Table A2. (continued)

[a]Behavioral Items	Convinced Sustainers[1]	Sustainable Wannabes[2]	Sustainable Non-Believers[3]	Non-Sustainers[4]
I travel by bike or public transport because this is better for the environment	3.38^{24} [1.32]	2.35^{13} [1.25]	2.90^{24} [1.17]	1.83^{13} [1.07]
[b]I use the car whenever it suits me	3.07^{4} [1.37]	2.44 [1.33]	2.84^{4} [1.25]	2.14^{13} [1.30]
I make the conscious decision to travel less often to disrupt the environment as little as possible	2.95^{24} [1.28]	2.25^{14} [1.15]	2.15^{4} [1.09]	1.78^{123} [1.15]
I travel by public transport to avoid traffic jams	2.33^{4} [1.36]	1.79 [1.05]	2.29^{4} [1.14]	1.55^{13} [0.91]
Nature				
Whenever I see garbage (e.g., plastic) on the streets, I pick it up	3.45^{34} [1.13]	2.89 [1.17]	2.84^{1} [1.13]	2.54^{1} [1.41]
I donate to a charity that focuses on nature	3.43^{234} [1.45]	2.49^{14} [1.36]	2.45^{14} [1.20]	1.66^{123} [1.03]
I encourage others to do their best for the preservation of nature	3.77^{234} [0.87]	2.88^{14} [1.12]	3.08^{14} [0.98]	2.05^{123} [0.98]
I refrain from buying fruit and vegetables that have been treated with pesticides	3.38^{234} [1.14]	2.46^{14} [0.99]	2.53^{14} [1.02]	1.88^{123} [0.98]
I use as little soaps and similar products as possible because they are bad for the environment	3.27^{234} [1.10]	2.52^{1} [0.95]	2.75^{14} [0.99]	2.15^{13} [1.08]
I use water sparingly to prevent spoilage and pollution	4.10^{34} [0.82]	3.80^{4} [0.83]	3.39^{14} [0.95]	2.81^{123} [1.14]
Whenever I buy eggs, I choose organic eggs	3.86^{234} [1.21]	3.09^{14} [1.29]	2.86^{14} [1.16]	1.80^{123} [1.10]

Note. Each Likert-type item is measured by a 5-point rating scale, ranging from 1 = *not applicable* to 5 = *applicable*.
[a]Items in superscript indicate which means are significantly different from each other (analysis of variance post hoc analysis [Scheffe test, $p \leq .001$] searching for differences among all combinations of groups). For example, the notation 3.86^{234} in the second row in this Table indicates that Convinced Sustainers report significantly higher behavior in living sustainably compared to the Sustainable Wannabes (3.18), the Sustainable Non-Believers (2.84), and the Non-Sustainers (1.98). [b]Recoded to facilitate the interpretation of data into the same direction, which is a higher score for pro-sustainable behavior.

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References

Almosa, Y., Parkinson, J., & Rundle-Thiele, S. (2017). Littering reduction: A systematic review of research 1995–2015. *Social Marketing Quarterly*, *23*, 203–222. doi:10.1177/1524500417697654

Anable, J. (2005). "Complacent car addicts" or "Aspiring environmentalists"? Identifying travel behavior segments using attitude theory. *Transport Policy*, *12*, 65–78. doi:10.1016/j.tranpol.2004.11.004

Brundtland Commission & World Commission on Environment and Development. (1987). *Our common future: Report of the world commission on environment and development*. Oxford, England: Oxford University Press.

Bohringer, C., & Jochem, P. (2007). Measuring the immeasurable. A survey of sustainability indices. *Ecological Economics*, *63*, 1–8. doi: 10.1016/j.ecolecon.2007.03.008

Callegaro, M., Lozar Manfreda, K., & Vehovar, V. (2015). *Web survey methodology*. Washington, DC: Sage.

Cattell, R. B. (1966). The scree-test for the number of factors. *Multivariate Behavioral Research*, *1*, 254–276. doi:10.1207/s15327906mbr0102_10

Chaney, D. (1996). Lifestyles. London, England: Routledge.

Davis, J. N., Spaniol, M. R., & Somerset, S. (2015). Sustenance and sustainability: Maximizing the impact of school gardens on health outcomes. *Public Health Nutrition*, *18*, 2358–2367. doi:10.1017/S1368980015000221

Devellis, R. F. (2012). *Scale development: Theory and applications*. Washington DC: Sage.

Elliott, W., Destin, M., & Friedline, T. (2011). Taking stock of ten years of research on the relationship between assets and children's educational outcomes: Implications for theory, policy and intervention. *Children and Youth Services Review*, *33*, 2312–2328. doi:10.1016/j.childyouth.2011.08.001

Evans, D., & Abrahamse, W. (2009). Beyond rhetoric: The possibilities of and for "sustainable lifestyles." *Environmental Politics*, *18*, 486–502.

Finisterra do Paço, A. M., Barata Raposo, M. L., & Filho, W. L. (2009). Identifying the green consumer: A segmentation study. *Journal of Targeting, Measurement and Analysis for Marketing*, *17*, 17–25. doi:10.1057/jt.2008.28

Gilg, A., Barr, S., & Ford, N. (2005). Green consumption or sustainable lifestyles? Identifying the sustainable consumer. *Futures*, *37*, 481–504. doi:10.1016/j.futures.2004.10.016

Groves, R. M., Fowler, F. J., Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2009). *Survey methodology*. Hoboken, NJ: Wiley.

Hanss, D., & Böhm, G. (2012). Sustainability seen from the perspective of consumers. *International Journal of Consumer Studies*, *36*, 678–687. doi:10.1111/j.1470-6431.2011.01045.x

Haustein, S., & Hunecke, M. (2013). Identifying target groups for environmentally sustainable transport: Assessment of different segmentation approaches. *Current Opinion in Environmental Sustainability*, *5*, 197–204. doi:10.1016/j.cosust.2013.04.009

Hedlund-de Witt, A., de Boer, J., & Boersema, J. J. (2014). Exploring inner and outer worlds: A quantitative study of worldviews, environmental attitudes, and sustainable lifestyles. *Journal of Environmental Psychology*, *37*, 40–54. doi:10.1016/j.jenvp.2013.11.005

Hoekstra, J., Verheggen, P. P., & Hannink, M. (2013). *Vijf tinten groen. input voor effectieve duurzaamheidsstrategieën* [Five Shades of Green: Input for Effective Sustainability Strategies]. Amsterdam, the Netherlands: Motivaction Research and Strategy.

Julsrud, T. E. (2014). Activity-based patterns of everyday mobility: The potential for long-term behavior change across five groups of travelers. *Journal of Environmental Policy & Planning*, *16*, 401–417. doi:10.1080/1523908X.2013.837380

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement*, *20*, 141–151. doi:10.1177/001316446002000116

Korda, H., & Itani, Z. (2013). Harnessing social media for health promotion and behavior change. *Health Promotion Practice*, *14*, 15–23. doi:10.1177/1524839911405850

Kouris, I., & Koutsouris, D. D. (2016). Citizen engagement in the mHealth ecosystem using mobiles and wearable devices. In A. A. Lazakidou, S. Zimeras, D. Iliopoulou, & D. D. Koutsouri (eds.), *mHealth ecosystems and social networks in healthcare* (pp. 29–37). Cham, Switzerland: Springer.

Kreuter, M. W., Farrell, D. W., Olevitch, L. R., & Brennan, L. K. (2013). *Tailoring health messages: Customizing communication with computer technology*. New York, NY: Routledge.

Kumanyika, S., & Grier, S. (2006). Targeting interventions for ethnic minority and low-income populations. *The Future of Children*, *16*, 187–207.

Larson, L. R., Stedman, R. C., Cooper, C. B., & Decker, D. J. (2015). Understanding the multi-dimensional structure of pro-environmental behavior. *Journal of Environmental Psychology*, *43*, 112–124. doi:10.1016/j.jenvp.2015.06.004

Martin, N. T., Ross, S. R., & Irwin, R. L. (2015). Utilizing community-based social marketing in a recycling intervention with tailgaters. *Journal of Intercollegiate Sport*, *8*, 57–81. doi:10.1123/jis.2014-0128

Milfont, T. L., & Duckitt, J. (2010). The environmental attitudes inventory: A valid and reliable measure to assess the structure of environmental attitudes. *Journal of Environmental Psychology*, *30*, 80–94. doi:10.1016/j.jenvp.2009.09.001

Moldan, B., Janouskova, S., & Hak, T. (2012). How to understand and measure environmental sustainability: Indicator and targets. *Ecological Indicators*, *17*, 4–13. doi:10.1016/j.ecolind.2011.04.033

Montgomery, K. C. (2015). Youth and surveillance in the Facebook era: Policy interventions and social implications. *Telecommunications Policy*, *39*, 771–786. doi:10.1016/j.telpol.2014.12.006

Mooi, E., & Sarstedt, M. (2011). *A concise guide to market research: The process, data, and methods using IBM SPSS Statistics*. Berlin, Germany: Springer.

Morelli, J. (2011). Environmental sustainability: A definition for environmental professionals. *Journal of Environmental Sustainability*, *1*, 19–27. doi:10.14448/jes.01.0002

Morrison, J. T. (2009). Evaluating factor analysis decisions for scale design in communication research. *Communication Methods and Measures*, *3*, 195–215. doi:10.1080/19312450903378917

Motivaction Research and Strategy (May, 2017). StemPunt. Retrieved from https://www.motivaction.nl/stempunt

Newton, P., & Meyer, D. (2013). Exploring the attitude-action gap in household resource consumption: Does "environmental lifestyle" segmentation align with consumer behavior? *Sustainability*, *5*, 1211–1233. doi:10.3390/su5031211

Pearson, D., & Perera, A. (2018). Reducing food waste: A practitioner guide identifying requirements for an integrated social marketing communication campaign. *Social Marketing Quarterly*, *24*, 45–57. doi:10.1177/1524500417750830

Robinson, L., Cotten, S. R., Ono, H., Quan-Haase, A., Mesch, G., Chen, W., . . . Stern, M. J. (2015). Digital inequalities and why they matter. *Information, Communication & Society*, *18*, 569–582. doi:10.1080/1369118X.2015.1012532

Scott, M. G., McCarthy, A., Ford, R., Stephenson, J., & Gorrie, S. (2016). Evaluating the impact of energy interventions: Home audits vs. community events. *Energy Efficiency*, *9*, 1221–1240. doi:10.1007/s12053-015-9420-9

Singh, R. K., Murty, H. R., Gupta, S. K., & Dikshit, A. K. (2012). An overview of sustainability assessment methodologies. *Ecological Indicators*, *15*, 281–299. doi:10.1016/j.ecolind.2008.05.011

Statistics Netherlands (2015, March 12). Retrieved from https://www.cbs.nl/en-gb/news/2015/11/9-in-10-people-access-the-internet-every-day

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behavior: An integrative review and research agenda. *Journal of Environmental Psychology*, *29*, 309–317. doi:10.1016/j.jenvp.2008.10.004

Stobel, M. E. (1981). *Lifestyle and social structure: Concepts, definitions, analyses*. New York, NY: Academic Press.

Taniguchi, A., & Fujii, S. (2007). Promoting public transport using marketing techniques in mobility management and verifying their quantitative effects. *Transportation*, *34*, 37. doi:10.1007/s11116-006-0003-7

Vanhonacker, F., van Loo, E. J., Gellynck, X., & Verbeke, W. (2013). Flemish consumer attitudes towards more sustainable food choices. *Appetite*, *62*, 7–16. doi:10.1016/j.appet.2012.11.003

Verain, M. C. D., Bartels, J., Dagevos, H., Sijtsema, S. J., Onwezen, M. C., & Antonides, G. (2012). Segments of sustainable food consumers: A literature review. *International Journal of Consumer Studies*, *36*, 123–132. doi:10.1111/j.1470-6431.2011.01082.x

Worthington, R. L., & Whittaker, T. A. (2006). Scale development research: A content analysis and recommendations for best practices. *The Counseling Psychologist*, *34*, 806–838. doi:10.1177/0011000006288127

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